DOCUMENT RESUME

ED 374 705 HE 027 709

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TITLE Implications for Higher Education in the Linkages of Student Differences and Effective Teaching.
PUB DATE Apr 94
NOTE 25p.; Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 4-8, 1994). Figure and tables contain small type.
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Academic Achievement; Achievement Need; College Faculty; *College Students; Foreign Countries; Higher Education; Individual Differences; *Learning Motivation; Learning Strategies; Student Attitudes; *Student Characteristics; Student Evaluation of Teacher Performance; Student Motivation; *Teacher Effectiveness; Teaching Methods
IDENTIFIERS University of Manitoba (Canada)

ABSTRACT

This study examined the effects of individual differences, attitudes, past performances, and teaching behaviors on 286 undergraduate college students' achievement, attribution, affective, and motivational outcomes. The study was conducted at the University of Manitoba using a theoretical model based on Weiner's theory of achievement motivation. The students, all in a introductory psychology course, completed a questionnaire which covered: gender, anger-proneness, text anxiety, locus of control, high school grade point average, and last introductory psychology test score. Students then saw one of four video tapes on effective instruction where presentations maintained a high lecture content density while expressiveness, organization, and clarity were varied and manipulated. Students then completed a teaching behavior inventory to assess the lecture's presentation for expressiveness, organization, and clarity. Students also took an achievement test to assess retention and conceptual understanding of the lecture. Structural equation modeling was used to examine the relationships among variables. Results indicated that student differences and teaching behaviors differentially influenced student learning and learning related outcomes depending on where these latter variables were included in the model. Both clarity and expressiveness were directly related to students' perceptions of amount learned, whereas organization was directly related to actual achievement outcomes. Student perceptions of success also significantly affected student learning experiences. One figure and five tables of data are appended. (Contains 18 references.) (Author/JB)

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Implications for Higher Education in the Linkages of Student Differences and Effective Teaching

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Presented at AERA Annual Meeting

April 7, 1994

New Orleans

NE027 709

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Abstract

This paper examines the effects of student differences, attitudes, past performances, and teaching behaviors on students achievement, attribution, affective, and motivational outcomes. A theoretical model based on Weiner's theory of achievement motivation and containing 24 variables, was formulated. The data came from a Western Canadian University study of 286 undergraduate students. Structural equation modeling is used to examine the relationships among variables. Results indicated that student differences and teaching behaviors differentially influence student learning and learning related outcomes depending on where these latter variables are included in the model. Of significance to student learning experiences are their perceptions of success.

Implications for Higher Education in the Linkages of Student Differences and Effective Teaching

Although recent research on teaching in higher education has increased our knowledge of what behaviors constitute effective teaching (Feldman, 1989; Marsh & Dunkin, 1991; Murray, 1991) and which student differences constitute adaptive learning orientations (McKeachie, Pintrich, Lin, & Smith, 1986), there has been a notable lack of progress in understanding the joint contribution of effective teaching and student variables in learning conditions. Furthermore, much of the research in this area tends to be atheoretical, lacking suitable conceptual frameworks. Thus, the aim of this paper was to begin to organize what is known about effective teaching and student learning differences within the framework of Weiner's (1986) attributional theory of achievement motivation, and to hypothesize some implications for further empirical investigation.

Effective teaching has been identified by a number of teaching behaviors that correlate with student achievement. The most important ones include organization (r = .57), clarity (r = .56), and expressiveness (r = .35; Cohen, 1987, Feldman, 1989, Murray, 1991). Although important in supporting the strength of the relationship between effective teaching and student achievement, these studies are unable to reveal the critical causal linkages. Perry et al., (see Perry, 1991 for a review) addressed this problem through a number of controlled laboratory studies. However, their research focused on the causal linkages of one teaching behavior on student learning. The present study extended previous ones by empirically demonstrating the causal linkages of the aforementioned teaching behaviors on student learning.

Educational researchers' efforts to delineate the factors which enhance or impede student performance in the college classroom have resulted in a long-standing theme in higher education: the importance of individual differences in the ability to learn and benefit from instruction (McKeachie et al., 1986). Whereas some of these characteristics are catalytic, enhancing learning, others impede scholastic achievement, resulting in debilitating consequences. Entry characteristics such as test anxiety (Corno & Snow, 1986; Tobias, 1985), locus of control (Perry & Magnusson, 1989), previous high school GPA and gender (Clifton, 1993) are known to influence student learning. However, literature on the causal relationships between student difference and teaching effectiveness on student learning is limited and in most instances atheoretical.

The Theoretical Model

Weiner's (1986) attribution theory of achievement motivation may provide the theoretical framework needed to address the above issues. The underlying concept of achievement assumed in Weiner's model is defined with respect to an individual achieving in a competitive setting. Weiner maintains that students assess their academic performance as either success or failure, react in a related emotional manner (positively or negatively) in response to their judgment, and search for the reason that caused the outcome. In turn, the attributions selected for the outcome have important and distinct systematic effects on students' emotional reactions and motivation, which jointly determine subsequent scholastic related performance. Combining Weiner's theory with recent advances in instructional simulations and student differences, a micro-analytical analysis of teaching-learning process was undertaken. It was hypothesized that student differences and effective teaching behaviors would have a causal effect on student attributions, affects, and motivation as defined by Weiner's model. Structural equation modeling was employed to test the hypothesis.

Figure 1 presents the model that guided our analyses. Weiner's theory is extended by including student differences and teaching behaviors. The model assumes that student differences and effective teaching behaviors are the exogenous variables whereas scholastic performance, perceptions of success and control, attributions, and affects are intervening variables, and motivation is the final dependent variable of interest.

METHOD

Subjects

109 male and 177 female introductory psychology students at the University of Manitoba participated in the study. Experimental sessions were randomly assigned after participants selected session times.

Variables

Student differences. A self-report questionnaire probed students regarding Gender, Easily-Anger (Survey of Work Styles: Mavrogiannis & Jackson, 1987), Test Anxiety (Sarason, 1975), and Locus of Control (Internal External; Lefcourt, von Baeyer, Ware, & Cox, 1979).

Scholastic performance. Students were also asked to provide their high school GPA and their last introductory psychology test score.

Teaching behaviors. Students were exposed to one of four effective instruction 25-min. color videotapes. Presentations maintained a high lecture content density while expressiveness (i.e., humor, voice intonation, eye contact, body movement), organization (i.e., outline, of presentation varied (i.e., low, high), and clarity (i.e., examples, illustrations, etc.) were manipulated. The lectures were presented with an Advent 1000A Videobeam Color Projection Unit onto a 2.2 meter diagonal screen to ensure that the presentation was as lifelike as possible. Students completed a 16-item teaching behavior inventory to assess the lecture's presentation in terms of the behavioral attributes of expressiveness, organization, and clarity.

Lecture achievement. An achievement test, consisting of 30 multiple-choice items derived from the lecture, was administered to assess retention and conceptual understanding of the lecture.

Perceptions of success and control, attributions, affects, and motivation. On ten-point scales, students rated the extent to which attributions (i.e., effort, ability, luck, and test difficulty) determined their postlecture achievement performance (0 = not at all; 9 = entirely). They also rated the importance of doing well, their perceptions of success and control, amount that they perceived to have learned and assessed their emotional motivational response to their test performance. These latter items were also assessed on ten-point scales (0 = not at all; 9 = entirely).

Procedure

Participants, in groups of 40-50, completed the student differences questionnaire. Thereafter, they were exposed to one of four effective instruction 25-min. color videotapes. A lecture achievement test was administered followed by a post-lecture questionnaire. Finally, students completed the teaching behavior inventory and were briefed on the nature of the experiment.

RESULTS

Zero Order Relationships

The correlation matrix, means, and standard deviations are displayed in Table 1. The correlation coefficients are used to estimate the parameters of the model using ordinary least squares procedures (Duncan, 1975; Heise, 1975). Among the variables in the correlation matrix is one nominal variable--gender--for which a dummy variable was created (Pedhazur, 1982). Of interest are several of the zero-ordered correlations. First, high school GPA is positively related academic achievement in the university setting such as the psychology test score. As educational literature has

repeatedly demonstrated, students' high school GPA's are good indicators of university scholastic performance. Second, expressive instruction is positively related to student perception of amount learned, but is not related to actual student learning. Exposure to expressive instruction tends to deceive students into believing that they have learned something, when in fact, expressiveness has little influence on their actual achievement performance. Third, perceived success is positively correlated to perceived control, ability attributions, all student affects and motivation. These findings suggest that as students' levels of success are increased, more internal attributions are made, their affects become more positive and their motivation is increased. Fourth, students with high perceptions of control tend to have stronger feelings of confidence. Finally, confidence is positively related to student motivation. Thus, a number of factors are related to student learning and learning related outcomes. In order to understand the causal connections of these correlations, the multivariate relationships were examined.

Multivariate Relationships

In the left panel of Table 2, the standardized and unstandardized effect parameters are reported for past scholastic performance and attitudes. As hypothesized in the theoretical model, high school GPA is directly related to Introduction to Psychology test scores (.525). Students who perform well during high school also tend to do well in university classes such as Introduction to Psychology classes. Furthermore, low in comparison to high test anxiety (-.160) and students easily- as compared to not easily-angered (.106) are more likely to score high on psychology tests. Low test anxious students are at an advantage when it comes to test taking situations, given their strong confidence under these circumstances (Schonwetter, 1994). Easily-angered is one component describing Type A-ness, a behavior pattern identifying highly competitive individuals. Both latter groups of students are driven by their need to control their environment, a cognitive that is thought to enhance their learning experiences (Schonwetter, 1994).

Student attitudes are not influenced. For instance, high test anxious students are more concerned in doing well than the low test anxious students (.196). Also, internal as compared to external locus of control students are more likely to attend to (.119) and be alert to (.148) lecture material being presented. Internals, are also endowed with a need to control their environment by virtue of their

label. This need for control is demonstrated in their high levels of attending and alertness to the lecture presentation.

The middle panel in Table 2 reports the standardized and unstandardized effect parameters for lecture achievement scores, both actual and perceived. The reduced-form effect parameters and the fully-recursive effect parameters are reported in steps 1 and 2 respectively. Net of the other independent and intervening variables, high school GPA has a positive effect on lecture achievement score (.210). Students with high past scholastic track records tend excel at future academic endeavors. In addition, males in comparison to females (.156), not-easily-angered as compared to easily-angered students (-.131), and students exposed to high as compared to low organized instruction (.128) tend to do well on the lecture achievement test. Finally, both past psychology test scores (.231) and alertness to lecture (.200) are positively related to lecture achievement scores.

The outcomes for perceived amount learned are somewhat different. First, net of the other independent and intervening variables, expressive and clear instruction are positively related to amount perceived learned (.275 & .165). In other words, students who are exposed to high as compared to low expressiveness and clarity also tend to perceive that they have learned more. In addition, females tend to perceive they have learned more than males (-.128).

When student attitudes and past scholastic performance variables are added in the fully recursive model, the amount of variance explained is increased by approximately 9% for lecture achievement and 9% perceived amount learned. In other words, students' past performance and alertness to lecture presentation has an effect on the relationship between the independent variables and lecture achievement scores, whereas only student attitudes have an effect on the relationship between the independent variables and perceived amount learned. Thus past performance is a good indicator of actual future achievement, whereas student attitudes impact both actual and perceived student achievement.

On the right panel of Table 2 both reduced form (Steps 1 & 2) and fully recursive parameters (Step 3) for the variables that affect perceptions of success and control are displayed. First, net of the other independent and intervening variables, the easily-angered variable is negatively related to student perceptions of success (-.200) and control (-.215). Furthermore, males are more likely to perceive success than females (.131). This finding is not new, given that the lecture material

indirectly reflected material related to mathematics (i.e., economics), a content area that tends to be more favorable to males than females (Greenglass, 1982). The effects of student attitudes, specifically the importance to do well, is strongly related to perceived success (.241). The inclusion of perceived amount learned was positively related to perceptions of success (.133) and perceptions of control (.203). However, actual achievement was only related to perceptions of success (.303). Finally, the amount of variance was increased by 12% (from .083 to .201) when student attitudes were added to the model, whereas an 8% increase was demonstrated with the addition of student actual and perceived achievement. However, the increase in the amount of variance for perceived control was minimal, 1% for student attitudes and 4% for student achievement.

In Table 3, the standardized and unstandardized effect parameters are reported for student attributions. Surprisingly, only a few significant effects are found. Ironically, lecture clarity is positively related to attributions made to test difficulty (.135). In other words, the higher the clarity rating of the lecture, the more likely that students attributed the lecture test as being very difficult. Second, the attitude of importance to do well was positively related to the ability attribution (.193). The more important it was for students to do well, the more they attributed their performance to ability.

Finally, the addition of student perception of success and control to the model had a major impact on their attributions. First, perceived success was positively related to ability attribution (.228). This latter addition to the model increased the amount of variance by approximately 3% (.177 - .143). Second, perceived control was positively related to effort attribution (.174), however, negatively related to luck attribution (-.228). In both cases, the amount of variance was increased by approximately 4% (.096 - .057; .123 - .079).

In Table 4, the standardized and unstandardized effect parameters are reported for student affects. Surprisingly, the addition of student attributions had an inconsequential impact on their affects. Nevertheless, some of the other variables in the model have important effects on student affects. First, high test anxious students tend to feel more helpless (-.113) and ashamed (-.065) than low-test anxious students. According to these results, high test anxiety leads to negative affects, whereas low-test anxiety produces positive affects. Next, males tended to be more encouraged than females (.125). This may be a direct reflection of the fact that males performed better than females on the

achievement task. Third, easily-angered students felt more helpless (-.116) and ashamed (-.164) than less easily-angered students. Here, wanting control over their environment, these students' first exposure to an economics test may have placed them out of control and their self-critical attitude may have led to stronger feelings of shame. Finally, the more alert the student was to the lecture, the more likely he/she felt pride (.112). Intuitively this makes sense. The more alert one is to a lecture, the more probable a successful achievement score, which in turn, usually increases a person's pride.

The addition of student perceptions of success and control to the model increased the amount of variance substantially for discouraged-encouraged, 17.5% (.329 - .154), helpless-confident, 17.6% (.276 - .100), and ashamed-pride, 14.7% (.270 - .123). Net of the other independent and intervening variables, perceived success has a large positive effect on discouraged-encouraged (.389), helpless-confident (.330), and ashamed-pride (.429). In other words, students who have high as compared to low perceptions of success as a result of their lecture achievement performance are more likely to experience more positive affects. Perceived control was less influential, impacting student encouragement (.127) and student confidence (.208).

In Table 5, the standardized and unstandardized effect parameters are reported for student motivation. Net of the other independent and intervening variables, each of the following variables was positively related to motivation: attending to the lecture (.147), importance to do well (.212), amount perceived to have learned (.137), perceptions of success (.123) and control (.106), ability attribution (.146), and feelings of encouragement (.362). As each of these variables are included into the model, the variance accounted is increased: student attitudes 21.5% (.261 - .047), student achievement 3% (.291 - .261), perceptions of success and control 10.9% (.400 - .291), attributions 1.9% (.419 - .400), and affects 9.5% (.514 - .419). Thus, variables with the exception of student differences, influence student motivation.

According to the model initially proposed, student differences such as high school GPA, gender, test anxiety, and anger and teaching behaviors, predict student achievement and learning related outcomes. Achievement in turn, influences perceptions of success and control. Perceived success plays an important role in determining attributions and affects, causing students to make more internal attributions (i.e., ability) for their performance and to feel more pride, more

encouragement, and more confident about their performance. Student affects, in particular, encouragement, translated into influencing achievement motivation for future performance. Finally, the effects of most variables were either mediated or suppressed through variables that were added to the model in successive steps. For instance, anxiety's influence on students' pride was mediated to a great extent by perceptions of success, whereas gender's impact on student achievement was suppressed to a lesser extent by students' level of attending to the lecture presentation.

The present findings extends previous studies and confirms Weiner's theory in identifying the causal linkages that occur between effective teaching and student differences on student learning and learning related outcomes such as achievement, attributions, affects, and motivation.

IMPLICATIONS FOR HIGHER EDUCATION

Effective teaching, as defined by expressiveness, clarity, and organization, and student difference variables, defined by gender, locus of control, anxiety, and anger, have important implications for student achievement and achievement related outcomes. Teaching behaviors uniquely influence student achievement. For example, both clarity and expressiveness are directly related to students' perceptions of amount learned, whereas organization is directly related to actual achievement outcomes. Instructors concerned with impacting their students' perceptions of learning are encouraged to present clear and expressive lectures. However, instructors wishing to enhance students' actual learning are stressed to include organization as a key teaching behavior.

Predispositions placing students at-risk academically include low high school GPA's high test anxiety, and external locus of control. These differences are thought to be related in that each reflects a poor learning orientation. Remedial programs aimed at reducing or modifying these maladaptive learning orientations need to be made available to students. Students' perceptions of success plays a critical role in their learning experience. As demonstrated in the present study, perceptions of success have direct impact on students' perceived and actual achievement outcomes, their attributions, affects, and motivation. Therefore, by increasing students' perception of success in the university classroom, one may increase the various components making up the student's learning experience.

In order to improve the quality of higher education for all students, researchers and educational practitioners need to expand their focus, encompassing all factors influencing learning. Cross

(1976) warns practitioners and researchers of an "investigative lens too narrowly focused". Even though the need for focus is important, the need to become more comprehensive is crucial, especially when attempting to explain the teacher-student paradigm in higher education. As a consequence, practitioners may improve the quality of students' learning experiences. Finally, structural equation modeling supports Weiner's model as a viable theoretical framework for both the practitioner in explaining teaching-learning dynamics and for the researcher in guiding further empirical research on the teaching-learning process.

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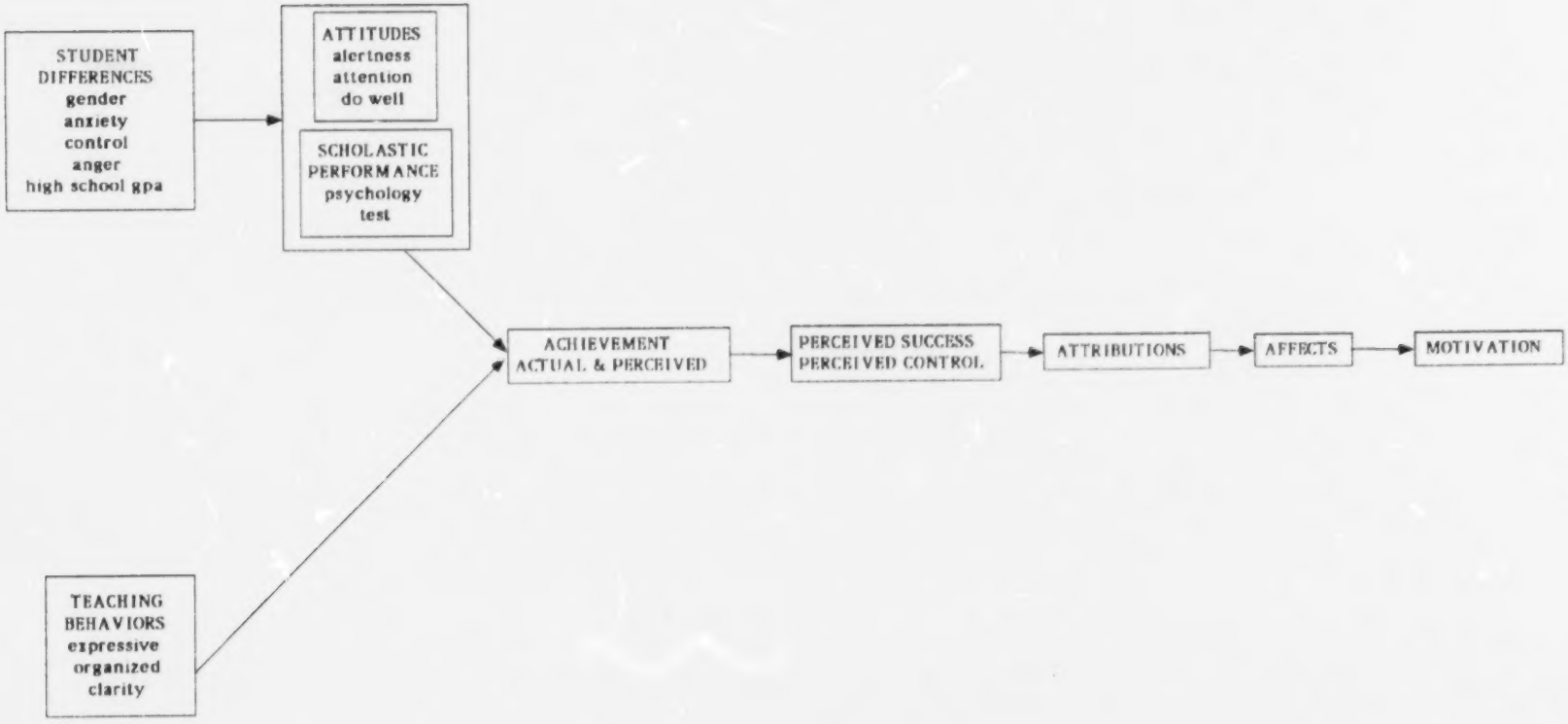

Figure 1. The Model

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Table 1
Correlation Coefficients, Means, and Standard Deviations for the Variables in the Theoretical Model

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.
1. Gender																							
2. Anxiety	-.244																						
3. Anger	.048	.195																					
4. Internality	-.087	-.107	-.057																				
5. Expressiveness	-.008	.047	-.056	.016																			
6. Clarity	-.053	-.055	-.023	.044	.358																		
7. Organization	-.126	-.073	-.063	.061	.334	.502																	
8. High School GPA	-.143	-.008	-.110	-.144	-.090	.030	-.023																
9. Psychology test	.064	-.159	.031	-.132	-.136	-.049	-.062	.505															
10. To do well	-.132	.207	.029	.040	.058	.090	.035	-.004	-.030														
11. Attend to lecture	-.145	.099	.011	.127	.165	.177	.168	-.009	-.064	.249													
12. Lecture alertness	-.111	-.058	-.039	.162	.150	.123	.178	.039	-.023	.126	.385												
13. Achievement	.112	-.209	-.142	-.018	.028	.095	.143	.315	.343	.048	.196	.149											
14. Perceived learned	-.200	.084	-.043	.111	.412	.355	.312	-.047	-.032	.255	.359	.299	.112										
15. Perceived Success	.140	-.200	-.062	-.009	.147	.092	.135	.014	.016	.249	.198	.178	.363	.226									
16. Perceived Control	.096	-.223	-.036	.085	.110	.058	.129	.021	.053	.075	.064	.084	.195	.200	.461								
17. Luck	-.005	.120	-.031	-.110	-.041	.036	-.002	.006	-.078	.011	-.104	-.126	-.153	-.117	-.151	-.269							
18. Test Difficulty	.077	.024	-.035	-.005	.048	.107	-.042	.042	.078	.080	.060	.020	.086	.076	-.018	-.083	.114						
19. Effort	.056	-.087	-.035	.007	.003	.036	.001	.095	.154	.087	.064	.051	.173	.069	.200	.233	-.098	.234					
20. Ability	.086	-.072	-.048	.011	.036	.037	-.016	.016	.054	.243	.207	.113	.201	.020	.307	.094	-.041	.310	.431				
21. Ashamed-Pride	.104	-.194	-.017	.022	.029	.118	.157	.003	.045	.110	.027	.171	.169	.119	.473	.230	-.101	.088	.210	.264			
22. Discouraged	.120	-.168	-.093	.010	.039	.085	.132	-.036	.054	.095	.205	.181	.238	.174	.516	.361	-.139	-.059	.206	.200	.436		
23. Helpless-Confident	.082	-.233	-.036	.029	.068	.075	.107	.021	.044	.055	.099	.111	.168	.125	.459	.407	-.170	-.070	.153	.157	.497	.544	
24. Motivation	-.074	-.076	-.049	.125	.118	.098	.100	-.065	-.085	.378	.358	.205	.144	.333	.482	.322	-.100	.044	.124	.310	.339	.529	.343
Means	1.38	19.54	45.94	2.97	15.43	11.15	22.99	4.60	6.10	4.91	6.69	6.08	27.71	4.69	5.54	6.13	3.83	6.40	7.22	6.84	4.73	5.47	4.63
Standard Deviations	0.49	8.64	9.87	4.99	5.50	2.75	7.54	2.11	2.52	2.36	2.30	2.39	7.34	2.38	1.99	2.38	2.49	2.34	2.11	2.06	1.57	1.88	1.97

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Table 2.
Standardized and Unstandardized Regression Coefficients and R^2s for Last Psychology Test Score, How Important It was to Do Well, Extent to which Student Attended to Lecture, Alertness to Lecture, Achievement Total, Amount Perceived Learned, Perceived Success and Perceived Control

Independent Variables	Psychology Test Score	Important to Do Well	Extent Attended Lecture	Alertness to Lecture	Lecture Achievement Score		Amount Perceived Learned		Perceived Success			Perceived Control		
					Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Gender	.086	-.078	-.098	-.089	.148**	.156**	-.158**	-.128**	.118*	.161**	.131*	.073	.085	.092
	(.436)	(-.372)	(-.461)	(-.466)	(2.23)	(2.341)	(-.764)	(-.621)	(.474)	(.651)	(.530)	(.350)	(.408)	(.443)
Internality	-.059	-.008	.119*	.148**	-.074	-.102	-.019	-.034	-.019	-.018	.018	.022	.019	.038
	(-.030)	(-.008)	(.056)	(.077)	(-.056)	(-.077)	(-.019)	(-.008)	(-.004)	(-.004)	(.004)	(.005)	(.005)	(.009)
Anger	.106*	-.024	.017	.006	-.143**	-.131*	.061	.043	-.169**	-.234***	-.200***	-.201***	-.222***	-.215***
	(.027)	(-.030)	(.004)	(.001)	(-.124)	(-.113)	(.017)	(.012)	(-.039)	(-.054)	(-.046)	(-.055)	(-.061)	(-.059)
Anxiety	-.160**	.196**	.090	-.061	.013	-.006	.079	.039	-.019	-.061	-.065	.073	.062	.055
	(-.047)	(.054)	(.024)	(-.018)	(.020)	(-.010)	(.038)	(.019)	(-.008)	(-.025)	(-.026)	(.035)	(.030)	(.026)
Organization	-.059	.049	.073	.112	.147*	.128*	.092	.068	.010	.086	.038	.111	.109	.079
	(-.030)	(.023)	(.022)	(.038)	(.144)	(.125)	(.029)	(.021)	(.026)	(.023)	(.010)	(.035)	(.034)	(.025)
Clarity	-.000	-.019	.100	.010	.004	-.011	.192**	.165**	-.008	-.050	-.068	-.049	-.063	-.095
	(-.000)	(-.006)	(.086)	(.009)	(.012)	(-.030)	(.168)	(.144)	(-.006)	(-.036)	(-.050)	(-.043)	(-.055)	(-.083)
Expressive	-.042	.098	.100	.010	.010	-.002	.303***	.275***	.128*	.099	.063	.106	.100	.044
	(-.039)	(.084)	(.086)	(.009)	(.014)	(-.003)	(.132)	(.120)	(.047)	(.036)	(.023)	(.046)	(.043)	(.019)
High School GPA	.525****	.018	.099	.115	.333***	.210***	-.036	-.098	.039	.052	.000	.056	.046	.040
	(.615)	(.008)	(.042)	(.054)	(1.18)	(.743)	(-.041)	(-0.111)	(.037)	(.049)	(.000)	(.064)	(.052)	(.045)
Psychology test score						.231***		.106		-.030	-.115		.020	-.029
						(.684)		(.101)		(-.024)	(-.091)		(.019)	(-.028)
Alertness						.200***		.130**		.080	.048		.016	-.016
						(.638)		(.121)		(.062)	(.037)		(.015)	(-.015)
Extent attend to lecture						.048		.166**		.130*	.047		.034	-.024
						(.139)		(.170)		(.111)	(.040)		(.034)	(-.025)
Important to Do well						.047		.141**		.274***	.241***		.116*	.082
						(.148)		(.142)		(.232)	(.204)		(.117)	(.082)
Perceived Learned											.133*			.203**
											(.112)			(.202)
Achievement											.303***			.121
											(.082)			(.039)
R^2	.313	.062	.085	.078	.183	.271	.270	.364	.083	.201	.282	.081	.098	.136

Unstandardized coefficients in parantheses.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 3.
Standardized and Unstandardized Regression Coefficients and R^2s for Attributions

Independent Variables	Effort				Ability				Luck				Test Difficulty			
	Step 1	Step 2	Step 3	Step 4	Step 1	Step 2	Step 3	Step 4	Step 1	Step 2	Step 3	Step 4	Step 1	Step 2	Step 3	Step 4
Gender	.051	.060	.051	.024	.079	.112	.075	.049	.023	.017	.023	.044	.095	.097	.094	.111
	(.243)	(.256)	(.217)	(.104)	(.324)	(.465)	(.309)	(.201)	(.116)	(.087)	(.117)	(.222)	(.448)	(.456)	(.446)	(.521)
Anger	-.012	-.027	-.015	-.023	-.039	-.047	-.036	-.039	-.069	-.057	-.074	-.065	-.047	-.058	-.051	-.046
	(-.002)	(-.006)	(-.003)	(-.010)	(-.008)	(-.010)	(-.008)	(.008)	(-.018)	(-.014)	(-.019)	(-.016)	(-.011)	(-.014)	(-.012)	(-.011)
Anxiety	-.068	-.070	-.058	-.005	-.046	-.098	-.074	-.037	.136*	.120	.108	.059	.057	.056	.061	.029
	(-.017)	(.017)	(-.014)	(-.001)	(-.011)	(-.023)	(-.018)	(-.009)	(.040)	(.035)	(.031)	(.017)	(.016)	(.015)	(.016)	(.008)
Internality	.018	.012	.011	.006	.015	-.019	-.014	.003	-.102	-.087	-.083	-.071	.014	.010	.009	.011
	(.008)	(.005)	(.004)	(.003)	(.006)	(-.008)	(-.006)	(.001)	(-.051)	(-.044)	(-.042)	(-.036)	(.006)	(.005)	(.004)	(.005)
Organization	-.017	-.021	-.038)	-.054	-.049	-.061	-.071	-.077	.000	.016	.040	.058	-.120	-.122	-.132	-.122
	(-.005)	(-.006)	(-.010)	(-.015)	(-.013)	(-.016)	(-.019)	(-.021)	(.000)	(.005)	(.013)	(.019)	(-.037)	(-.038)	(-.040)	(-.037)
Clarity	.037	.028	.020	.042	.047	.008	.029	.041	.077	.080	.097	.075	.161*	.155*	.149*	.135*
	(.029)	(.021)	(.016)	(.033)	(.035)	(.006)	(.022)	(.031)	(.071)	(.074)	(.089)	(.069)	(.138)	(.133)	(.127)	(.116)
Expressiveness	.007	.060	-.007	-.020	.038	.016	.048	.036	-.079	-.067	-.038	-.028	.030	.029	.017	.025
	(.003)	(.002)	(-.003)	(-.008)	(.014)	(.006)	(.018)	(.013)	(-.036)	(-.031	(-.017)	(-.013)	(.013)	(.012)	(.007)	(.011)
High School GPA	.103	.035	.018	.011	.026	.047	-.042	-.040	-.022	.034	.050	.060	.047	-.000	-.006	-.002
	(.104)	(.035)	(.019)	(.011)	(.025)	(.038)	(-.040)	(-.039)	(-.026)	(.041)	(.060)	(.071)	(.053)	(-.000)	(-.007)	(-.002)
Psychology test score		.132	.104	.118		.000	.026	.051		-.098	-.058	-.064		.092	.077	.068
		(.111)	(.087)	(.099)		(.000)	(.021)	(.042)		(-.098)	(-.057)	(-.064)		(.086)	(.071)	(.063)
Alertness		.019	.008	.007		.033	.041	.030		-.080	-.060	-.064		.005	-.002	-.001
		(.016)	(.007)	(.006)		(.026)	(.032)	(.023)		(-.777)	(-.058)	(-.062)		(.005)	(-.002)	(-.001)
Extent attend to lecture		.053	.025	.026		.174**	.164**	.153*		-.087	-.044	-.049		.045	.028	.028
		(.048)	(.023)	(.023)		(.152)	(.143)	(.133)		(-.094)	(-.047)	(-.053)		(.045)	(.028)	(.028)
Important to Do well		.096	.085	.051		.235***	.245***	.193**		.019	.040	.058		.062	.053	.074
		(.086)	(.076)	(.046)		(.203)	(.211)	(.166)		(.020)	(.042)	(.062)		(.061)	(.053)	(.073)
Perceived Learned			.050	.004			-.117	-.140*			-.108	-.062			.042	.069
			(.044)	(.003)			(-.100)	(-.119)			(-.113)	(-.065)			(.041)	(.067)
Achievement			.100	.055			.146*	.081			.128	.100			.048	.076
			(.028)	(.016)			(.040)	(.022)			(-.043)	(-.034)			(.015)	(.024)
Perceived Success				.078				.228***				.001				-.053
				(.083)				(.232)				(.001)				(-.061)
Perceived Control				.174**				.039				.228***				-.100
				(.155)				(-.033)				(-.239)				(-.100)
R^2	.021	.048	.057	.096	.016	.120	.143	.177	.035	.058	.079	.123	.036	.049	.052	.065

[a]Unstandardized coefficients in parantheses.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

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Table 4.
Standardized and Unstandardized Regression Coefficients and R^2s for Affects

Independent Variables	Discouraged-Encouraged					Helpless-Confident					Ashamed-Pride				
	Step 1	Step 2	Step 3	Step 4	Step 5	Step 1	Step 2	Step 3	Step 4	Step 5	Step 1	Step 2	Step 3	Step 4	Step 5
Gender	.106	.133*	.125*	.058	.065	.044	.062	.061	-.066	.003	.087	.105	.100	.041	.022
	(.406)	(.509)	(.477)	(.221)	(.248)	(.173)	(.246)	(.241)	(-.022)	(.012)	(.274)	(.333)	(.315)	(.130)	(.071)
Anger	-.071	-.083	-.063	-.076	-.076	.018	.016	.028	.013	.014	.021	.020	.033	.025	.024
	(-.014)	(-.016)	(-.012)	(-.015)	(-.015)	(.004)	(.003)	(.006)	(.003)	(.003)	(.003)	(.003)	(.005)	(.004)	(.004)
Anxiety	-.119	-.133*	-.119	-.005	-.001	-.221**	-.241**	-.234**	-.116*	-.113	-.162**	-.174**	-.164**	-.075	-.065
	(-.026)	(-.029)	(-.026)	(-.001)	(-.000)	(-.051)	(-.055)	(-.054)	(-.027)	(-.026)	(-.029)	(-.031)	(-.030)	(-.014)	(-.012)
Internality	-.011	-.047	-.051	-.033	-.033	-.009	-.011	-.014	-.004	-.007	.005	-.017	-.020	.010	.006
	(-.044)	(-.018)	(-.019)	(-.012)	(-.012)	(-.004)	(-.004)	(-.006)	(-.002)	(-.003)	(.002)	(-.005)	(-.006)	(.003)	(.002)
Organization	.123	.100	.072	.045	.043	.076	.066	.048	.012	.021	.140*	.129	.110	.094	.108
	(.030)	(.025)	(.018)	(.011)	(.011)	(.020)	(.017)	(.013)	(.004)	(.005)	(.029)	(.027)	(.023)	(.019)	(.022)
Clarity	.026	.002	-.015	.027	.034	.007	-.010	-.024	.021	.028	.053	.043	.031	.061	.050
	(.018)	(.002)	(-.010)	(.019)	(.023)	(.005)	(-.007)	(-.018)	(.015)	(.020)	(.030)	(.025)	(.018)	(.035)	(.029)
Expressiveness	-.012	-.038	-.070	-.102	-.099	.005	.040	.014	-.017	-.017	-.026	-.040	-.062	-.090	-.098
	(-.004)	(-.013)	(-.024)	(-.035)	(-.034)	(.020)	(.015)	(.005)	(-.006)	(-.006)	(-.007)	(-.011)	(-.018)	(-.026)	(-.028)
High School GPA	-.030	-.075	-.095	-.101	-.102	.035	.032	.023	.013	.016	.016	-.000	-.014	-.015	-.005
	(-.027)	(-.067)	(-.085)	(-.091)	(-.091)	(.033)	(.030)	(.021)	(.013)	(.015)	(.012)	(-.000)	(-.011)	(-.011)	(-.004)
Psychology test score		.075	.028	.079	.073		.002	-.028	.018	.014		.017	-.015	.037	.017
		(.056)	(.021)	(.059)	(.055)		(.001)	(-.022)	(.014)	(.011)		(.011)	(-.009)	(.023)	(.011)
Alertness		.017	.084	.067	.066		.048	.031	.018	.016		.159**	.143*	.121*	.112*
		(.078)	(.061)	(.049)	(.048)		(.037)	(.024)	(.014)	(.012)		(.096)	(.087)	(.073)	(.068)
Extent attend to lecture		.175**	.125*	.120	.106		.078	.045	.034	.027		-.059	-.093	-.115	-.138*
		(.141)	(.101)	(.089)	(.085)		(.066)	(.038)	(.029)	(.023)		(-.039)	(-.052)	(-.077)	(-.093)
Important to Do well		.087	.064	-.046	-.051		.084	.066	-.035	-.043		.149**	.133*	.024	.005
		(.070)	(.051)	(-.037)	(-.041)		(.070)	(.055)	(-.030)	(-.036)		(.099)	(.088)	(.016)	(.003)
Perceived Learned Achievement			.117	.032	.041			.095	.003	.010			.081	.022	.033
			(.092)	(.025)	(.032)			(.079)	(.003)	(.008)			(.053)	(.014)	(.021)
			.149*	.008	.008			.086	-.046	-.048			.102	-.035	-.060
			(.038)	(.002)	(.002)			(.023)	(-.012)	(-.013)			(.022)	(-.007)	(-.013)
Perceived Success				.406***	.389***				.345***	.330***				.456***	.429***
				(.383)	(.366)				(.340)	(.325)				(.356)	(.335)
Perceived Control				.152**	.127*				.228***	.208***				-.011	-.014
				(.120)	(.101)				(.189)	(.172)				(-.007)	(-.009)
Ability					.028					.043					.116
					(.026)					(.042)					(.089)
Effort					.085					.020					.059
					(.076)					(.018)					(.051)
Test Difficulty					-.085					-.061					.070
					(-.069)					(-.052)					(.047)
Luck					-.004					-.041					-.039
					(-.003)					(-.032)					(-.024)
R^2	.058	.128	.154	.329	.340	.068	.088	.100	.276	.283	.068	.111	.123	.270	.300

[a]Unstandardized coefficients in parantheses.
* $p < .05$. ** $p < .01$. *** $p < .001$.

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Table 5.
Standardized and Unstandardized Regression Coefficients and R^2s for Motivation

Independent Variables	Motivation					
	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Gender	-.088	-.029	-.015	-.069	-.080	-.105*
	(-.406)	(-.132)	(-.071)	(-.315)	(-.366)	(-.482)
Anger	-.022	-.021	-.006	-.016	-.014	.012
	(-.005)	(-.005)	(-.001)	(-.004)	(-.003)	(.003)
Anxiety	-.084	-.180**	-.179**	-.088	-.081	-.079
	(-.022)	(-.048)	(-.047)	(-.023)	(-.021)	(-.021)
Internality	.094	.038	.031	.045	.046	.057
	(.043)	(.017)	(.014)	(.020)	(.021)	(.026)
Organization	.023	.006	-.017	-.039	-.034	-.057
	(.007)	(.002)	(-.005)	(-.012)	(-.010)	(-.017)
Clarity	.042	-.020	-.052	-.018	-.024	-.039
	(.035)	(-.017)	(-.043)	(-.015)	(-.020)	(-.032)
Expressiveness	.091	.052	-.002	-.028	-.036	.007
	(.038)	(.022)	(-.000)	(-.012)	(-.015)	(.003)
High School GPA	-.059	-.031	-.028	-.034	-.026	.012
	(-.064)	(-.034)	(-.031)	(-.036)	(-.028)	(.013)
Psychology test score		-.056	-.095	-.055	-.056	-.083
		(-.051)	(-.086)	(-.050)	(-.050)	(-.075)
Alertness		.036	.006	-.007	-.012	-.091
		(.031)	(.006)	(-.006)	(-.010)	(-.098)
Extent attend to lecture		.259***	.210***	.198***	.175**	.147**
		(.252)	(.205)	(.193)	(.171)	(.143)
Important to Do well		.307***	.307***	.220***	.195***	.212***
		(.296)	(.296)	(.212)	(.188)	(.205)
Perceived Learned			.197**	.130*	.154**	.137**
			(.187)	(.123)	(.147)	(.131)
Achievement			.078	-.033	-.044	-.044
			(.024)	(-.010)	(-.014)	(-.013)
Perceived Success				.319***	.287***	.123*
				(.363)	(.326)	(.140)
Perceived Control				.122*	.146**	.106*
				(.117)	(.140)	(.101)
Ability					.164**	.146**
					(.183)	(.163)
Effort					-.056	-.091
					(-.060)	(-.108)
Test Difficulty					.010	.035
					(.010)	(.034)
Luck					.016	.010
					(.015)	(.018)
Ashamed-Pride						.071
						(.104)
Helpless-Confident						-.022
						(-.026)
Discouraged-Encouraged						.362***
						(.437)
R^2	.047	.261	.291	.400	.419	.514

Unstandardized coefficients in parantheses.
* $p < .05$. ** $p < .01$. *** $p < .001$.